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Transport Airplane Directorate
Attention: Gregg Bartley,
Airplane & Flightcrew Interface Branch,
ANM-111, Transport Airplane
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Service, 1601 Lind Avenue SW.
Renton, WA 98055-4056

FAA-2004-18775-14

Subject: Proposed Revisions to Advisory Circular 25.1329-1A, Automatic Pilot Systems Approval, Notice of Proposed Advisory Circular and Request for Comments

Ladies and Gentlemen:

The Air Line Pilots Association, International (ALPA), representing the safety interests of over 64,000 professional airline pilots flying for 43 airlines in the United States and Canada, has reviewed the subject document and offers the following.

The Federal Aviation Administration is proposing revisions to Advisory Circular, AC 25.1329-1A, "Automatic Pilot Systems Approval." The revised advisory circular provides guidance for demonstrating compliance with a proposed amendment to 14 CFR 25.1329, published concurrently with this proposed AC.

1. Comment to Section 9/Table/Rule (c) and Appendix A, definition for Minor Transient that reads: *"For purposes of this section, a minor transient is an abrupt change in the flight path of the airplane that would not significantly reduce airplane safety, and which involves flightcrew actions that are well within their capabilities involving a slight increase in flightcrew workload or some physical discomfort to passengers or cabin crew:"*

ALPA was involved in the Flight Guidance System Harmonization Working Group (FGSHWG) deliberating on many iterations on the wording and possible meanings and interpretations for the various transient issues. ALPA has concerns over the proposed definition of "minor transient" in that it conveys that it is necessarily abrupt and that it does involve an increase in crew workload and that it does involve physical discomfort.

Rationale: ALPA does not think these consequences are what should be implemented as a rule for the engagement, mode change, or disengagement of a modern flight guidance system (FGS). Whereas the response might be "abrupt" in terms of a short time constant to peak amplitude, hence discernable or noticeable to crew and perhaps passengers, the magnitude of the response should not increase workload or cause physical discomfort in most cases. The FGSHWG discussed variations in transient response that might differ from, for example, engagement or

disengagement in non-maneuvering flight versus maneuvering flight. At one point, it was even suggested that value bounds be put on the "minor transient" response of less than 0.5g and pitch/roll/yaw rates of less than 10 degrees per second. Even though (c) and (d) do state, "... must not cause ... any greater than a minor transient," ALPA believes that it would be helpful if the ensuing definition incorporated the same concept.

Recommendation: Change the definition of Minor Transient throughout the document to read "For the purposes of this section, a minor transient is *a response that produces no greater than* an abrupt change ..."

2. Comment re the Table 12A on Normal Conditions: Under Normal Conditions/Icing:
The table only lists Part 25 Appendix C icing conditions. However, the ARAC proposal and the ACJ 25.1329, Section 10.1, Normal Performance, states that the FGS should provide acceptable performance in a list of normal conditions that include "Icing, (trace, light, and moderate)." This may possibly be a Significant Regulatory Difference (SRD) between the AC and the ACJ. In any case, it seems the proposed AC does not fully address the icing requirements under Normal Conditions from the ARAC and JAA versions.

Rationale: ALPA understands the dilemma with airworthiness certification of the basic airframe to Appendix C and the FGS to seemingly more strict criteria. In addition, at the time the airframe icing certification is done, the FGS may still be under development. However, the intent of the safety community and ARAC effort was to require more analysis and compliance demonstrations for FGS intended for use in icing conditions than is current practice. The goal of the FAA Icing Steering Committee and the FAA Inflight Icing Plan was to increase the level of safety when icing conditions exceed Appendix C, including cases such as icing due to Supercooled Large Droplets (SLD). The Icing Plan and this NPRM Preamble acknowledge that in service experience, airplanes may encounter icing conditions exceeding Appendix C on a regular basis. The Icing Plan tasked ARAC to recommend acceptable compliance means in several areas, "regardless of whether the icing conditions are inside or outside of Appendix C," such as appropriate crew warnings. While more strict icing criteria may be born out elsewhere in AC 25.1329X, the information on Normal Conditions should retain the concept that up to moderate icing is a normal and routine condition for transport operations.

Recommendation: In the table for "Normal Conditions – Icing:" add another sentence that conveys the concept that "Operationally, normal icing conditions include trace, light, and moderate icing levels."

3. Comment to Section 16.b.4: add a new paragraph g, or wherever may be appropriate, that the compliance demonstrations should assess manual disconnects from a coupled approach mode after any pitch trim bias has occurred, where the FGS design incorporates pitch trim bias below some reference altitude (e.g., auto land modes).

Rationale: In service use, pilots routinely use the FGS for a coupled approach and then intentionally disconnect the FGS manually for a hand-flown landing once visual reference has been established with the runway. Systems incorporating pitch trim bias should be evaluated for

manual disconnects after the trim bias event to assess that there is no significant workload to then retrim in pitch for the subsequent manual landing.

4. Comment to Section 16 F, Human Factors Assessment: Add material that the human factors analysis should include evaluation of the FGS switchology, functionality, and crew procedures with respect to other airplanes in the family of airplanes of the manufacturer, where Mixed Fleet Flying or multiple type ratings are anticipated.

Rationale: While this would not apply to all certification programs, it probably will to major programs. Any significant differences in design philosophy, switchology, functionality, or crew procedures should be identified and included in FCOM documents. An example might be a button labeled TOGA (take off and go around) on the flight deck auto thrust hardware and called TOGA in training manuals with a stipulation that it is not intended for use for takeoff in a new design, and may have consequences if it was pressed for takeoff.

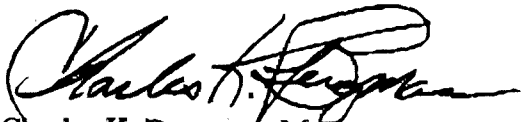
5. Comment to Appendix A, definition of Rare Normal Conditions: The definition reads, "*A fault-free condition that is experienced infrequently by the airplane due to severe environmental conditions (e.g., significant wind, turbulence, or asymmetric icing):*"

Use of the term "infrequently" in this definition may not be compatible with the information in the Preamble to the FAR NPRM. The Preamble says the distinction between normal and rare normal conditions is the severity of conditions, not the probability of occurrence. It states, "Rare normal conditions cannot imply anything about the probability ...". Many people will associate probability with the term "infrequently." The definition should be clarified to avoid the misinterpretation discussed in the Preamble.

Recommendation: Add a follow-on sentence (words are from the Preamble) to the definition of "Rare Normal Condition" to the effect: *"The distinction between Normal and Rare Normal Conditions is based on the severity of the condition encountered, not the probability of encountering that condition. For example, some icing conditions (possibly severe) may be encountered on a regular basis, and perhaps daily, in some climates."*

ALPA appreciates the opportunity to comment on the subject document.

Sincerely,



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